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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,234	09/17/2003	Chih-Han Chang	NTCP0004USA	3393
27765	7590	04/27/2005	EXAMINER	
NORTH AMERICA INTERNATIONAL PATENT OFFICE (NAIPC)			NGUYEN, KHIEM D	
P.O. BOX 506			ART UNIT	PAPER NUMBER
MERRIFIELD, VA 22116			2823	

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/605,234	Applicant(s) CHANG ET AL.	
	Examiner Khiem D. Nguyen	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-12 is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 22nd, 2005 has been entered. A new rejection is made as set forth in this Office Action. Claims (1-19) are pending in the application.

Drawings

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on February 22nd, 2005 have been approved.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

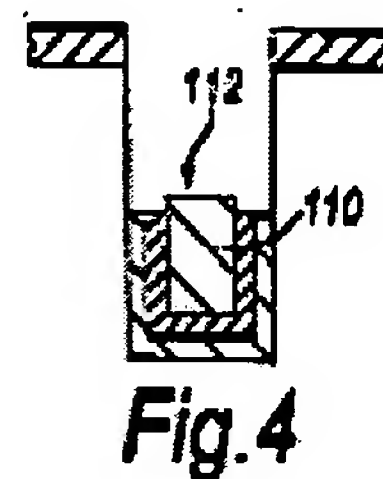
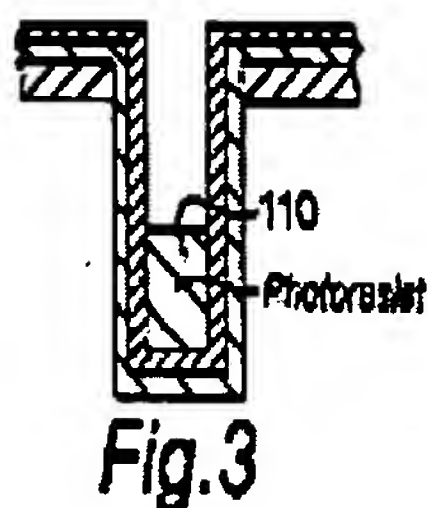
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 and 13-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Wensley et al. (U.S. Patent 6,316,310).

In re claim 1, Wensley discloses a method for forming a deep trench capacitor buried plate comprising: providing a substrate **100** having a pad oxide and the pad nitride layer **102** thereon (col. 2, lines 22-34), the pad oxide layer and a pad nitride layer having

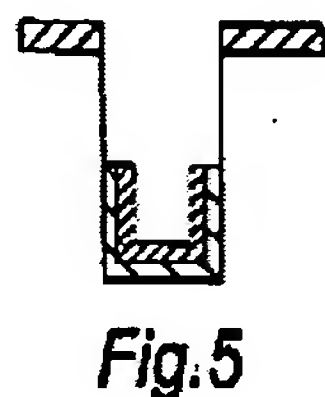
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at least an opening; performing a dry etching process for forming a deep trench **104** in the substrate via the opening (col. 2, lines 22-34); depositing a doped silicate glass film **106** on an inner wall of the deep trench (col. 2, lines 26-34); filling a sacrificial layer **110** into the deep trench (col. 2, lines 43-49); etching back the sacrificial for exposing parts of the doped silicate glass film (col. 2, lines 50-61 and FIGS. 3-4);

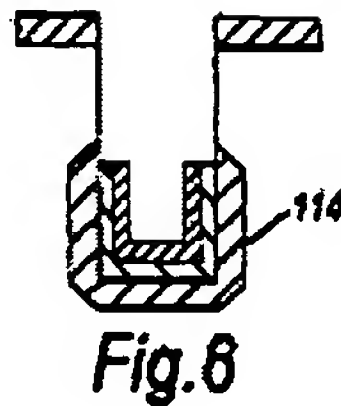


removing the exposed doped silicate glass film (FIG. 7);

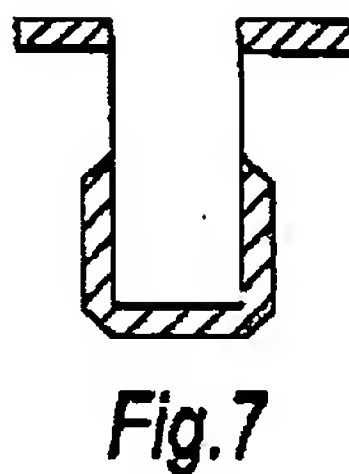
removing the remaining sacrificial layer (FIG. 5);



depositing a silicon nitride layer on the inner wall of the deep trench; performing a thermal process for forming a doped region **114** at a bottom of the trench (col. 2, lines 54-61 and FIG. 6);



removing the silicon nitride layer; and removing the doped silicate glass film (col. 2, lines 62-64 and FIG. 7);



wherein the silicon nitride layer serves as a barrier layer for preventing ions of the doped silicate glass film from diffusing into a collar region of the deep trench (col. 2, lines 65 to col. 3, line 20 and FIGS. 1-9).

In re claim 2, Wensley discloses that the doped silicate glass film **106** is an arsenic silicate glass (ASG) film (col. 2, lines 21-34).

In re claim 3, Wensley discloses that the arsenic silicate glass film is formed by a chemical vapor deposition (CVD) process (col. 2, lines 21-34).

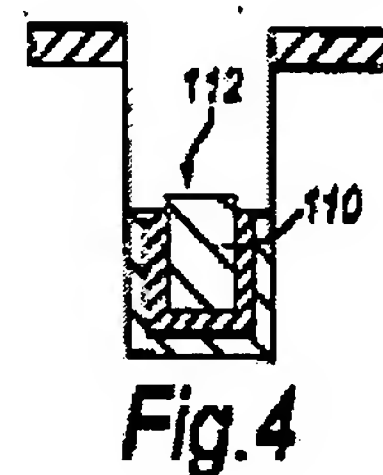
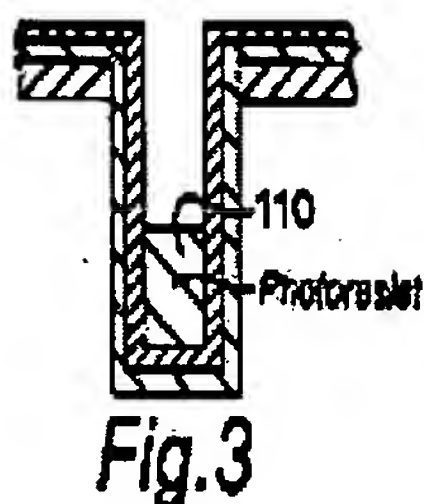
In re claim 4, Wensley discloses that the silicon nitride layer is formed by a chemical vapor deposition process (col. 2, lines 21-42).

In re claim 5, Wensley discloses that the doped silicate glass film is removed by an anisotropic etching process (col. 2, lines 50-53).

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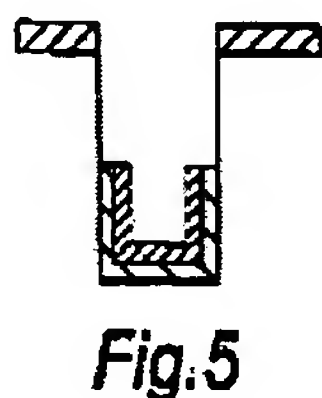
In re claim 6, Wensley discloses that the silicon nitride layer is removed by an anisotropic etching process (col. 2, lines 21-64).

In re claim 13, Wensley discloses a method for forming a deep trench capacitor buried plate comprising: providing a substrate **100** having a pad oxide layer and a pad nitride layer **102** thereon (col. 2, lines 22-34), the pad oxide layer and a pad nitride layer having at least an opening; performing a dry etching process for forming a deep trench **104** in the substrate via the opening (col. 2, lines 22-34); depositing a doped silicate glass film **106** on an inner wall of the deep trench (col. 2, lines 26-34); filling a sacrificial layer **110** into the deep trench (col. 2, lines 43-49); etching back the sacrificial for exposing parts of the doped silicate glass film (col. 2, lines 50-61 and FIGS. 3-4);



removing the exposed doped silicate glass film (FIG. 7);

removing the remaining sacrificial layer (FIG. 5);



depositing a silicon nitride layer on the inner wall of the deep trench after removing the remaining sacrificial layer; performing a thermal process for forming a doped region **114** at a bottom of the trench (col. 2, lines 54-61 and FIG. 6);

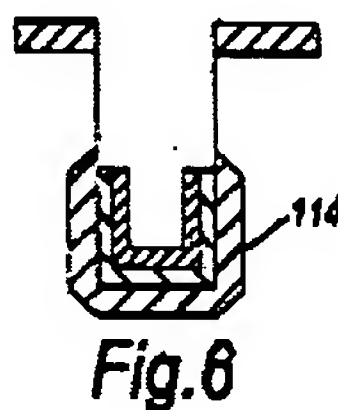


Fig. 6

removing the silicon nitride layer; and removing the doped silicate glass film (col. 2, lines 62-64 and FIG. 7);

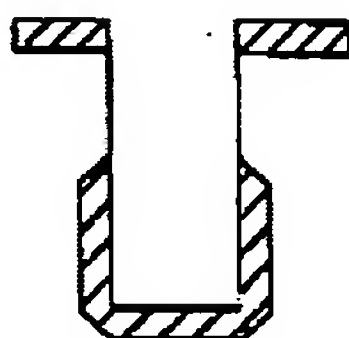


Fig. 7

In re claim 14, Wensley discloses that the doped silicate glass film **106** is an arsenic silicate glass (ASG) film (col. 2, lines 21-34).

In re claim 15, Wensley discloses that the arsenic silicate glass film is formed by a chemical vapor deposition (CVD) process (col. 2, lines 21-34).

In re claim 16, Wensley discloses that the silicon nitride layer is formed by a chemical vapor deposition process (col. 2, lines 21-42).

In re claim 17, Wensley discloses that the doped silicate glass film is removed by an anisotropic etching process (col. 2, lines 50-53).

In re claim 18, Wensley discloses that the silicon nitride layer is removed by an anisotropic etching process (col. 2, lines 21-64).

In re claim 19, Wensley discloses that the silicon nitride layer serves as a barrier layer for preventing ions of the doped silicate glass film from diffusing into a collar region of the deep trench (col. 2, lines 65 to col. 3, line 20 and FIGS. 1-9).

Allowable Subject Matter

Claims 7-12 are allowed.

Reasons For Allowance

The following is a statement of reasons for the indication of allowable subject matter: (See Applicants' arguments in the Amendment submitted on February 22nd, 2005 on page 10, lines 6-22).

Conclusion

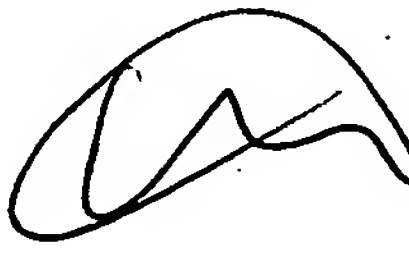
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D. Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K.N.
April 24th, 2005



W. DAVID COLEMAN
PRIMARY EXAMINER

AMENDMENTS TO DRAWING FIGURES

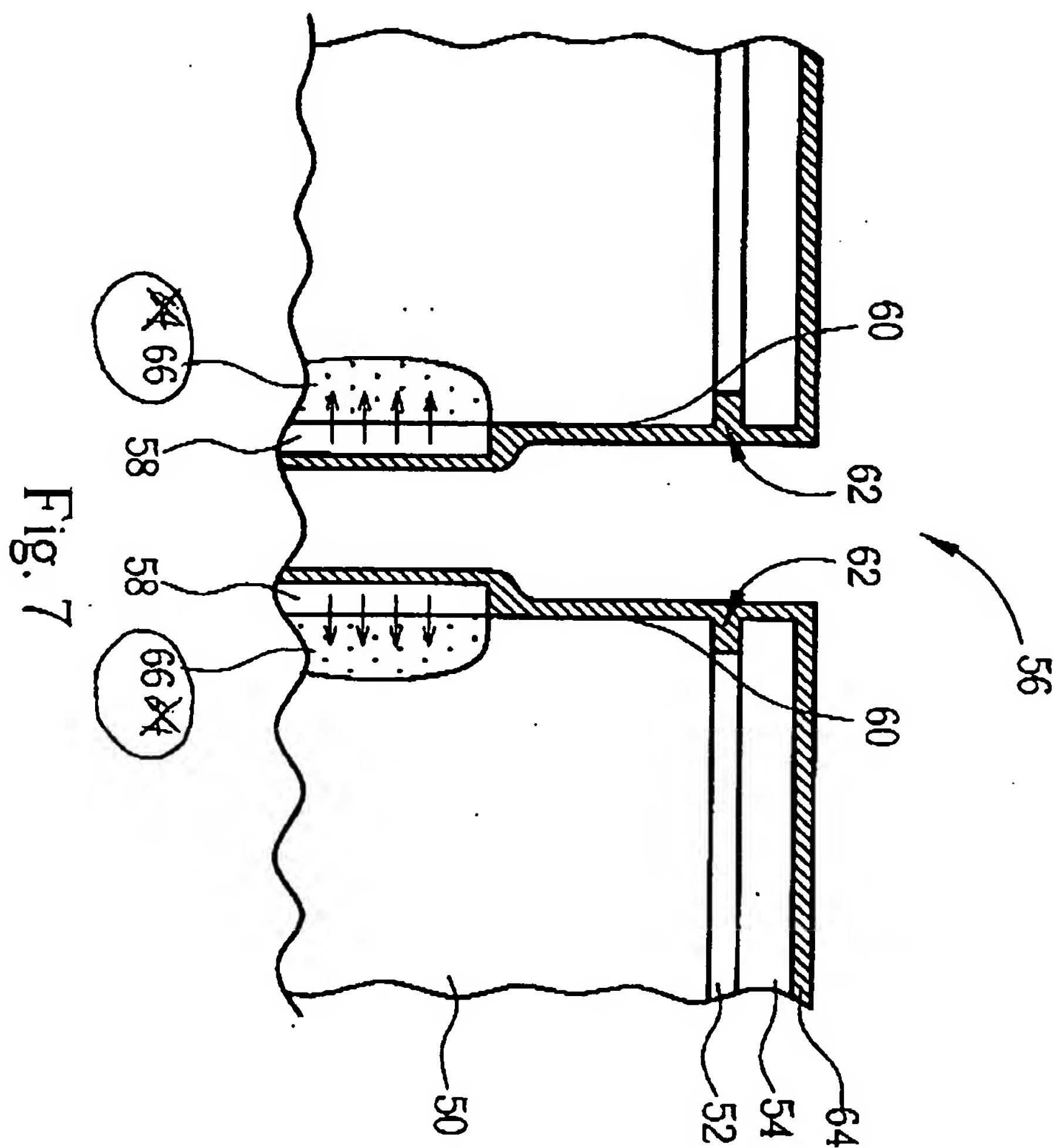
Figs.7 and 8 have been redrawn to change the numerals "64" of the doped region to "66" as shown in the encircled area of the attached "Annotated sheet". The applicant had mistakenly used the numeral "64" to refer to two different elements, and this error has been corrected. No new matter is introduced by the above amendments. Consideration of the proposed amendment to the drawings is politely requested.

Approved

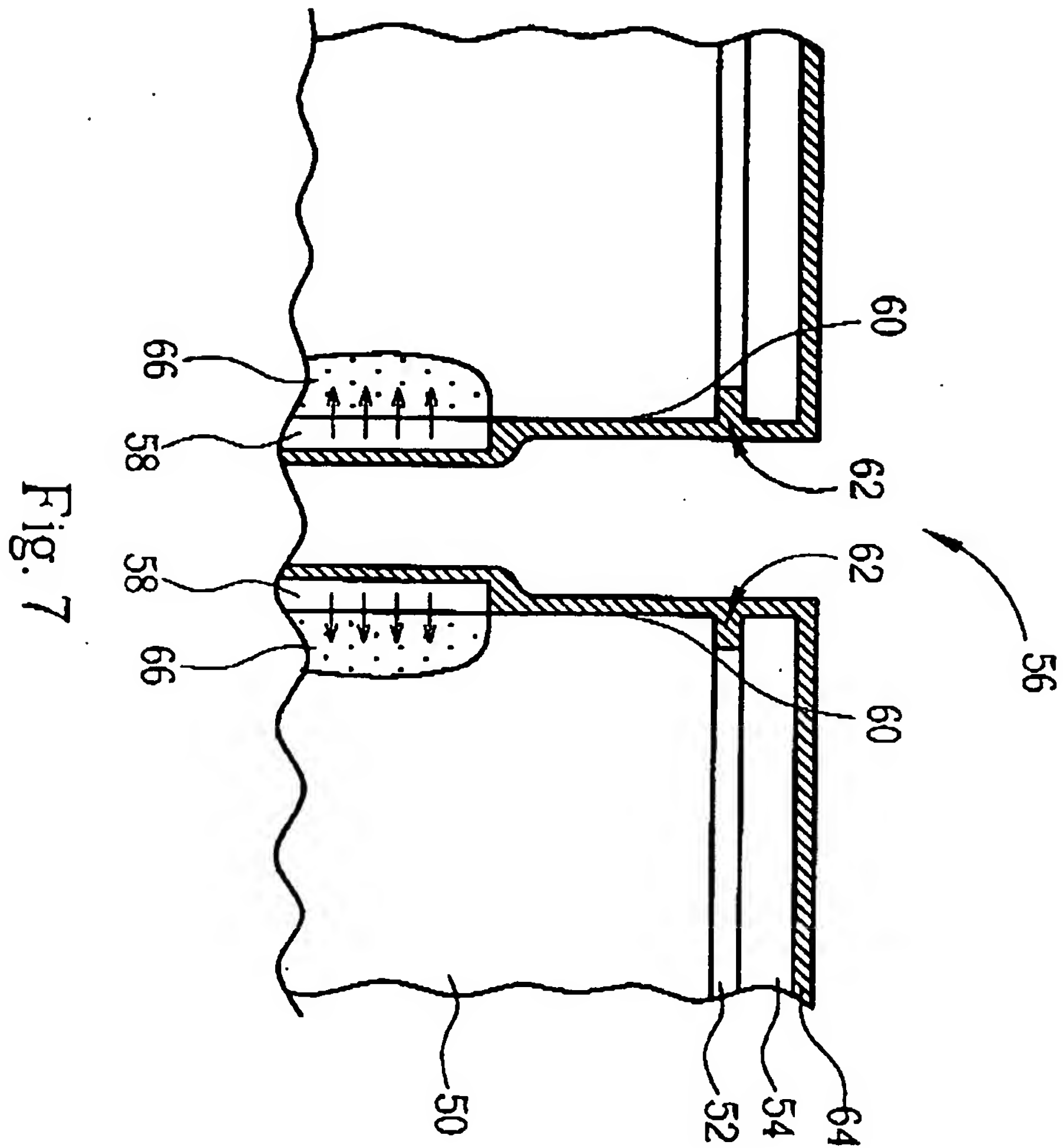
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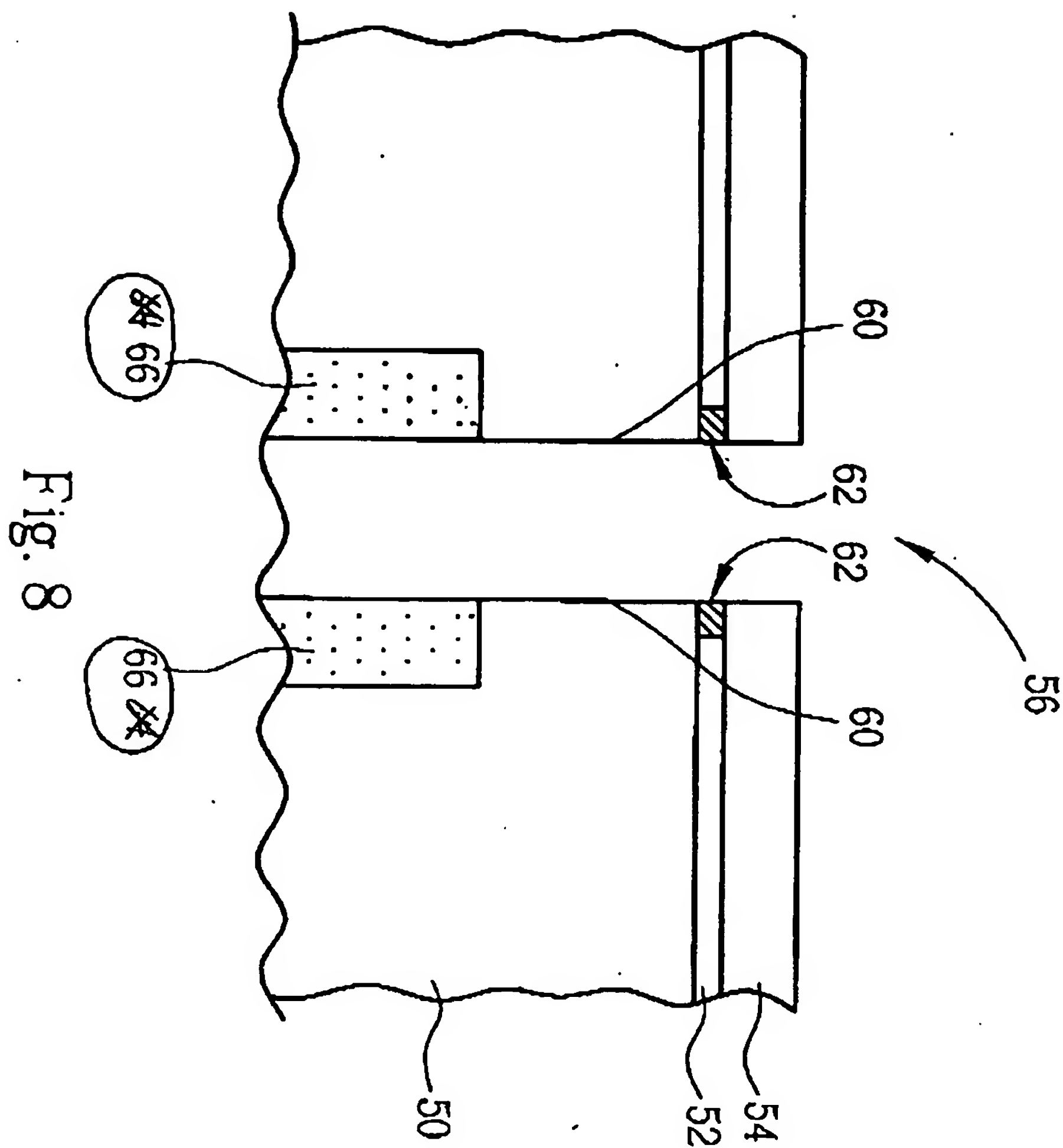
Annotated Sheet



Replacement Sheet



Annotated Sheet



Replacement Sheet

